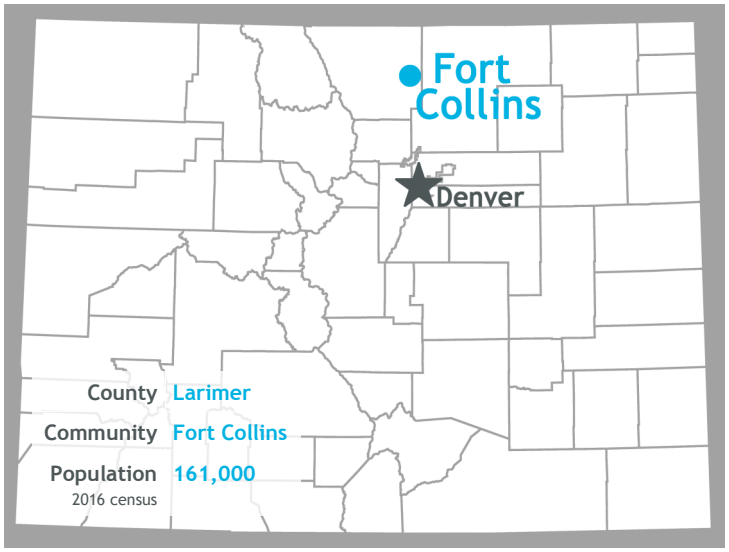
# Measurable Results Program
## Boxelder Sanitation District

## Introduction

Boxelder Sanitation District wastewater treatment facility is located south of the City of Fort Collins. This facility discharges to Boxelder Creek approximately 170 feet upstream of the confluence with the Cache La Poudre River. Neither of these water bodies meet water quality standards protective of aquatic life for Selenium. Additionally, Boxelder Creek does not meet recreational water quality standards for E. coli.




Boxelder Sanitation District upgraded an aerated lagoon wastewater treatment system to a twin oxidation ditch wastewater plant with ultraviolet light disinfection. The goals were to provide year-round ammonia treatment and address future nitrogen effluent limits.

This project was included in the Water Quality Control Division's Measurable Results Program. The goal of this program is to measure water quality improvements derived from point source infrastructure projects funded through the Water Pollution Control Revolving Fund. These studies are used to showcase water quality successes and help direct funding to projects with greatest potential for water quality improvements.

## Funding

The State Revolving Fund Program is administered by three agencies- the Colorado Department of Public Health and Environment, Water Quality Control Division; the Colorado Water Resources and Power Development Authority; and the Colorado Department of Local Affairs, Division of Local Government. These agencies administer the programs with common goals approved and supported by the Water Quality Control Commission and authority board of directors.

| Funding Sources and Amounts | |
|---|---|
| Water Pollution Control Revolving Fund loan (20 year loan at 2.5%) | $ 10,800,000 |
| District sewer reserve fund | $16,300 |
| **TOTAL PROJECT COST** | **$10,816,300** |

Because of competitive loan rates, Colorado's Revolving Fund program is well suited to finance publicly owned wastewater treatment, sewer rehabilitation, replacement and construction and storm water quality improvements. Since the program's inception, Colorado has provided more than $1.1 billion in financing for water pollution control. Communities may be eligible for assistance grants to fund planning and design phases with construction loan interest rates as low as zero to three percent.

## Project Timeline

**2010**
May— Preliminary engineering report. October— loan execution.

**2011**
Pre-project sampling events begin.

**2012**
April— design approval. May— construction start.

**2013**
Pre-project sampling events conclude. December— construction completed.

**2014**
Post-project sampling.

**2015**
Post-project sampling.

**2016**
Project analysis and report.

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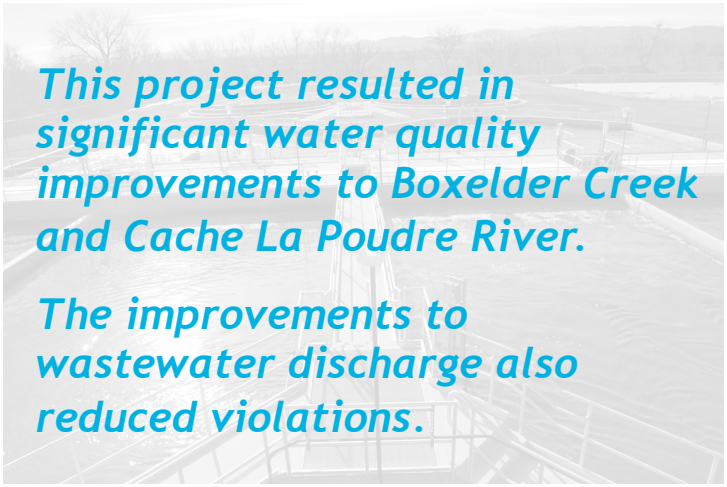
## Project Goal

Boxelder sanitation district is a wastewater treatment service provider for the City of Ft. Collins, Colorado. Their improvement project consisted of planning, designing and constructing a new three million gallon per day wastewater treatment system. To maintain healthy water quality, it is important that wastewater treatment facilities like Boxelder monitor and meet water quality limits provided in their facility permit.

At times, elevated levels of E. coli, biological oxygen demand and chlorine were measured in the old facility's wastewater discharge. This upgrade was designed to meet future permit requirements for year-round ammonia treatment and more stringent nitrogen requirements.



***This project resulted in significant water quality improvements to Boxelder Creek and Cache La Poudre River.***

***The improvements to wastewater discharge also reduced violations.***

A measurable results study compared pre and post project levels of key water quality parameters. This yielded the net environmental benefit from the facility upgrade to Boxelder Creek and the Cache La Poudre River. This study showed significant water quality improvements to Boxelder Creek and the Cache La Poudre River. Improvements to the wastewater effluent discharge were also achieved resulting in greatly reduced effluent violations.

### Pollutant reductions—Boxelder Creek below wastewater discharge

| PARAMETER | % REDUCTION |
|---|---|
| Total Nitrogen | 99% |
| Total Phosphorous | 95% |
| Ammonia | 99% |

### Pollutant reductions in wastewater effluent

| PARAMETER | % REDUCTION |
|---|---|
| Biological Oxygen Demand | 88% |
| Total Suspended Solids | 86% |
| Chlorine Residual | 100% |
| Selenium | 48% |
| E.coli | 67% |

### Important water quality factors

**Ammonia, selenium, residual chlorine** - In excess amounts, these can be toxic to aquatic life.

**Nitrogen, phosphorus** - In excess amounts, these increase algal and plant growth that in turn, decreases oxygen available for aquatic life and also impact recreational uses like fishing.

**Total suspended solids** - Impacts aquatic life by clogging fish gills, warming water and reducing visibility.

**E. Coli** - This is an indicator of potential human health risks associated with recreational uses of

## For more information...

Visit the CDPHE website to learn more and contact your regional project manager at www.colorado.gov/cdphe/wq-grants-and-loans.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